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A NEW SUBSPECIES OF *Aedes atropalpus* (COQUILLET) FROM
SOUTHWESTERN UNITED STATES¹

(DIPTERA: CULICIDAE)

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ABSTRACT—Adults of both sexes and the larva of *Aedes atropalpus nielseni*, n. subsp. from southwestern United States are described. Distinctive behavioral and physiological characteristics of this new subspecies are also listed.

Several authors have recognized morphological differences among populations of *Aedes atropalpus* (Coquillett), especially in the adult mesonotal scaling patterns (Dyar, 1928; Carpenter and LaCasse, 1955; Rozeboom, 1942). Initially such observations led to the description of additional species: *Aedes epactius* by Dyar and Knab (1908) and *Aedes perichares* by Dyar (1921). However, both forms were later synonymized under *Aedes atropalpus*, the former by Aitken (1942) and the latter by Kumm *et al.* (1940). Unfortunately, few specimens were used in either the original descriptions or the later reductions to synonymy. Moreover, in recent years our knowledge of the distribution of *Aedes atropalpus* has significantly increased. Thus the taxonomic status of these morphological variants needs to be re-examined.

The range of *A. atropalpus* extends from Labrador, Canada to Panama and from the Atlantic seaboard to Baja California. Since rockpools are the primary larval habitat, this species tends to be sparsely and irregularly distributed. Such a pattern of infrequent and isolated populations over a large geographical area favors the de-

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velopment of distinct races and species. To test for the occurrence of such forms, the authors examined specimens of *A. atropalpus* obtained from field collections made in many parts of the range of this species. From this analysis we have concluded that *A. atropalpus* is composed of at least four subspecies:

Subspecies	Known range
<i>Aedes atropalpus atropalpus</i> (Coq.)	Eastern and northern United States and Canada
<i>Aedes atropalpus epactius</i> D. & K.	Southern United States (Arkansas, eastern Colorado, Oklahoma, Missouri, Texas) and Mexico
<i>Aedes atropalpus perichares</i> Dyar	Costa Rica and El Salvador
<i>Aedes atropalpus nielseni</i> , n. subsp.	Southwestern United States (Arizona and Utah)

In this paper the new subspecies is described. Subsequent papers will discuss in greater detail the biological relationships between this subspecies and the three other forms of *Aedes atropalpus* (O'Meara and Craig, *in press*).

***Aedes atropalpus nielseni*, n. subsp.**

ADULT FEMALE: *Head region:* Clypeus, palps, and proboscis entirely dark. Proboscis length 2.1 to 2.7 mm. Palps approximately $\frac{1}{2}$ as long as the proboscis. Pedicel nude, except for several long, thin, hairs. Pedicel cuticle color light brown apically, slightly darker basally. Eye margin fringed with yellowish-white, narrow scales. Occiput cream scaled dorsally, golden scaled laterally. Erect forked scales mostly white. Frontal tuft yellow scaled. *Thoracic region:* Pronotum containing golden compressed scales. Scutal integument light brown. Scutal scales long and narrow with a pale yellow coloration. Frequently a few darker scales are intermixed with the light scales. Lateral scales usually similar to medial scales. Sometimes a slightly darker medial stripe may be present. Cream scales surround pre-scutellar bare space. Scutellum with a large medial patch of fine yellow scales and smaller lateral patches. Mesepimeral and sternopleural sclerites light tan. Other pleural sclerites light brown in coloration. All scales on these sclerites are white. Yellowish-white scales on inner femoral surface extending almost to the tibial articulation. Light scales on the outer medial surface extend $\frac{1}{10}$ the way down the fore and mid-femora and half way down the hind-femur. All femora-tibial articulations display cream white band of scales on both sides of the juncture. Similar bands at tibial-tarsal junctures. Remaining portions of the tibia dark scaled. Hind-tarsus with large basal and smaller apical ring of whitish scales at each tarsal juncture. Fifth tarsomere entirely white. Fore and mid-tarsi similar to hind-tarsi, but white rings smaller and tarsomere 5 completely dark. Wing length 3.5 to 4.0 mm. Wing scales narrow and dark except for a basal white patch on the costa which extends to and sometimes beyond the humeral cross vein. *Abdominal region:* Tergum I mostly nude except for a small medial patch of mixed white and dark brown scales. Terga II-VII contain a white band of scales

basally and a dark brown band of scales apically. Dark band twice as broad medially. The light and dark scale bands are about equal in width near the lateral edges. Cream-white scales occur basally on Tergum VIII, while brown scales are present in the central portion and the apical tip contains a narrow band of white scales. Sterna I and II with only cream white scales present. Sterna III-VII cream scaled basally and medially. Small patch of brown scales found on the latero-apical portion of each of these sternites. Sternum VIII predominantly cream-white scaled, with a few darker scales on apical portion.

ADULT MALE: Scaling patterns and colorations are in general similar to the adult female. Palps $\frac{7}{10}$ as long as proboscis. Wing length 3.0 to 3.5 mm. Fore and mid-tarsal claws are unequal, larger claw two-toothed, smaller claw with a single tooth. Hind tarsal claws are equal. *Terminalia:* Basistyle about $2\frac{1}{2}$ times longer than broad, tapered distally, with numerous setae especially apically. Apical lobe absent, basal lobe represented by a slightly elevated area containing long, thick setae. Dististyle about $\frac{3}{4}$ as long as basistyle, slender and evenly curved. Thin, straight, terminal claw about $\frac{1}{8}$ as long as dististyle. A short seta present on apical portion of dististyle. Stem of claspette spiculated basally and slightly curved apically. Filament about half the length of the stem, tapering to a blunt point. Paraproct containing a strongly sclerotized terminal knob which supports a short blunt claw.

LARVA: Head slightly wider than long. Antenna $\frac{1}{2}$ the head length. Antennal hair tuft 3 branched, inserted slightly distal to the mid-point. Upper and lower head hairs represented by single bristles. Preantennal hair 3-5 branched. Post-clypeal hair small, 2 branched, located posteriomedial to lower head hair. Siphonal hair of abdominal segment VIII 3 branched, while subsiphonal hair 6-8 branched. Two single anal hairs are present. Seventeen to twenty-seven comb scales are arranged in irregular rows. Siphon short and tapered apically, 0.6-0.7 mm. long and 0.3-0.4 mm. wide. Siphonal hair tuft 6-10 branched, inserted slightly beyond the mid-point, 1-4 teeth within the pecten. Pecten composed of 12-21 teeth, each containing 2-4 denticles. Apical teeth widely spaced. These teeth are also larger and have thicker denticles than basal teeth. A saddle covers the distal part of the anal segment. Dorsal brush composed of a long single lower bristle and a shorter 4-6 branched upper bristle on each side. Ventral brush composed of 7-9 bristles, each 6-10 branched, on the barred area and 1-2 bristles, each 4-8 branched, before the barred area.

HOLOTYPE: Type number 70737, U. S. National Museum, adult female obtained from reared larva, field collected by L. T. Nielsen, October, 1968, Grand County, Utah, breeding in rockpools along Colorado River near Moab, Utah.

PARATYPES: Nine adults; 5♂ and 4♀, U. S. National Museum, same collection as holotype.

OTHER LOCALITY: Sabino Basin, Arizona.

Each of the four subspecies of *Aedes atropalpus* can be most easily identified by its distinctive mesonotal scaling and color pattern. *Aedes atropalpus nielseni* displays the palest cuticle and scaling color. The over-all pale color is evident to the naked eye. The cuticle of *A. a. nielseni* is light tan, whereas the cuticle of the other three subspecies

is dark brown to black. This color difference is most striking on the pleural sclerites of the thorax and on the pedicel of the antenna. The medial mesonotal scales of *A. a. nielseni* are predominantly pale yellow and are rather narrow; the mesonotal scales of the other three subspecies are of variable pattern, usually dark and frequently broad. The lateral mesonotal scales of *A. a. nielseni* are generally indistinguishable from the medial scales; in the other three subspecies, the lateral scales are conspicuously different from the medial scales. The base of the costal vein of the wing is white-scaled in all four subspecies; only in *A. a. nielseni* does the patch of white scales extend beyond the humeral crossvein. The halteres of *A. a. nielseni* have only white scales; in the other three subspecies the halteres are capped with black scales. The male genitalia of all four subspecies are similar.

The larval body color is pale and yellow-gray in *A. a. nielseni*, while the type form is darker, with a gray-green cast. The other two subspecies are intermediate between those extremes. These colors are not evident in preserved material. The larva of the type form generally has more than 40 comb scales; *A. a. nielseni* resembles the other two southern subspecies in having less than 30 comb scales.

In addition to morphological properties, the subspecies differ in several behavioral and physiological characteristics. Females of *A. a. nielseni* are uniformly anautogenous, whereas females of the type form are completely autogenous. *A. a. epactius* and *A. a. perichares* are predominantly anautogenous and like *A. a. nielseni* are avid blood-feeders. In contrast *A. a. atropalpus* females are reluctant and irregular blood-feeders. *A. a. nielseni* is better adapted for survival in a desert environment. In laboratory experiments at 27°C and 80% R.H., adult females survived several weeks without food or water. The three other subspecies died within 4-6 days under these conditions.

All possible crosses between the subspecies have yielded numerous fertile F₁ offspring. All backcross progeny tested were also fertile. Thus all four subspecies appear to be interfertile. However, additional quantitative experimentation is needed to determine the extent of this interfertility.

Only two sites have been shown to contain *A. a. nielseni*. This form was the only one observed among more than 200 specimens collected in Grand County, Utah. A single adult specimen now in the U. S. National Museum was field-collected in the Sabino Basin, Arizona; this specimen displayed coloration patterns very similar to *A. a. nielseni* from Utah. Certainly, additional sampling is needed in the southwestern United States and in Central America so that both range of *A. a. nielseni* and its relationship to the other subspecies can be more accurately defined.

This subspecies is named after its first collector, Dr. Lewis T. Niel-

sen, Department of Biology, University of Utah. Thanks are due to Dr. Alan Stone, U. S. National Museum, for critical reading of the manuscript.

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THE GENUS ZAGLOBA IN CENTRAL AND SOUTH AMERICA

(COLEOPTERA: COCCINELLIDAE)

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ABSTRACT—A new species, *Zagloba obscura*, is described from Venezuela and a key to the Neotropical species of *Zagloba* is presented.

Several species of Coccinellidae were received for identification from Jorge Teran, Universidad Central de Venezuela, Maracay, Venezuela. The new species described here was found in this material. All of the specimens have been taken feeding on scale insects in Venezuela.

Casey (1899) erected the tribe Scymnillini for the genera *Scymnillus* Horn and *Zagloba* Casey. Since then *Zilus* Mulsant and *Delphastopsis* Casey have been placed in this tribe by Blackwelder (1945).

The Scymnillini, *Zagloba* in particular, bear a strong superficial resemblance to the Scymnini. The Scymnini have 11-segmented antennae

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